

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of provisioning a first device operable with internet protocol (IP) in a virtual circuit network, the method comprising the computer-implemented steps of:
the first device requesting a list of identifiers corresponding to virtual circuits from a configuration interface for the virtual circuit network;
receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from ~~[[a]]~~ the configuration interface for the virtual circuit network; and
iteratively applying each identifier to individual instances of interface configuration commands until connectivity with a remote device is established, comprising the steps of:
requesting, from a second device terminating the virtual circuit corresponding to an identifier selected from the list, an IP address of the second device;
wherein the second device terminating the virtual circuit is operable to provide connectivity to the remote device;
~~obtaining an~~ receiving the IP address ~~for a~~ of the second device terminating the virtual circuit corresponding to ~~[[an]]~~ the identifier selected from the list;
determining an IP address for the first device;
testing the virtual circuit corresponding to the identifier selected from the list for connectivity with the remote device; and
if the virtual circuit corresponding to the selected identifier provides connectivity to the remote device, then choosing the virtual circuit corresponding to the selected identifier for connecting to the remote device, otherwise,
iteratively applying the above steps for a next identifier in the list until the list is exhausted.
2. (Currently Amended) A method as recited in Claim 1, wherein the virtual circuit network comprises a frame relay network, and wherein the step of receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprises:

receiving a Local Management Interface (LMI) message comprising a list of at least one of a plurality of Data Link Connection Identifiers (DLCIs) in the network.

3. (Currently Amended) A method as recited in Claim 1, wherein the virtual circuit network comprises an Asynchronous Transfer Method (ATM) relay network, and wherein the step of receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprises:
receiving an Interim Local Management Interface (ILMI) message comprising a list of at least one of a plurality of Virtual Channel Identifiers or Virtual Path Identifiers (VCI/VPI) in the network.
4. (Currently Amended) A method as recited in Claim 1, wherein the step of iteratively applying each identifier to individual instances of interface configuration commands until connectivity with ~~[[a]]~~ the remote device is established further comprises:
iteratively incorporating successive virtual circuit identifiers from the list into dynamically constructed commands to configure an interface to the virtual circuit network and successively applying the commands to the interface.
5. (Currently Amended) A method as recited in Claim 1, wherein the step of testing ~~[[a]]~~ the virtual circuit corresponding to ~~[[an]]~~ the identifier selected from the list for connectivity with ~~[[a]]~~ the remote device further comprises the step of:
pinging the remote device, wherein the remote device comprises a configuration server.
6. (Currently Amended) A method as recited in Claim 1, wherein the step of ~~obtaining an~~ requesting the IP address ~~for the~~ of the second device terminating the virtual circuit ~~corresponding to the selected identifier,~~ further comprises:
forming an Inverse Address Resolution Protocol Request (IARP); and
sending the IARP request to ~~[[a]]~~ the second device terminating the virtual circuit; ~~and~~
~~receiving from the device terminating the virtual circuit an IP address.~~

7. (Currently Amended) A method as recited in Claim 1, wherein the step of determining [[an]] the IP address for the first device comprises the steps of:
determining a netmask for the first device, wherein the subnet for the first device is smaller than or equal to a subnet of the second device terminating the virtual circuit corresponding to the selected identifier; and
determining [[an]] the IP address for the first device valid in the subnet of the second device based upon the IP address of the second device terminating the virtual circuit.
8. (Currently Amended) A method as recited in Claim 7, wherein one or more of the steps of determining [[a]] the netmask for the first device and determining [[an]] the IP address for the first device valid in the subnet of the second device ~~based upon the address of the device terminating the virtual circuit corresponding to the selected identifier~~, further comprise[[s]] the steps of:
selecting a proposed netmask for a proposed subnet of smallest available size;
testing if [[an]] the IP address ~~for~~ of the second device terminating the virtual circuit ~~corresponding to the selected identifier~~ is valid within the proposed subnet;
if the IP address ~~for~~ of the second device terminating the virtual circuit is valid within the proposed subnet, then performing the following steps:
adding 1 to the IP address of the second device terminating the virtual circuit to form a first result, and testing whether the first result is a valid address;
if the first result is a valid address, choosing the first result as the IP address for the first device, otherwise, subtracting 1 from the IP address of the second device terminating the virtual circuit to form a second result and choosing the second result as the IP address for the first device;
otherwise, increasing the size of the proposed subnet and iteratively performing the above steps beginning with the testing step.
9. (Currently Amended) A method as recited in Claim 7, wherein one or more of the steps of determining [[a]] the netmask for the first device and determining [[an]] the IP address for the first device valid in the subnet of the second device ~~and based upon the address of~~

~~a device terminating the virtual circuit corresponding to the selected identifier~~, further comprise[[s]] the steps of:

determining a largest netmask less than or equal to 30 bits (255.255.255.252) such that

((ip_address_of _ the_device_terminating_VC & ~netmask) != 0) &&

((ip_address_of_the_device_terminating_the_VC | netmask) != ~0) is true;

adding 1 to the IP address of the second device terminating the virtual circuit to form a

first result, and testing whether the first result is a valid address ~~in the netmask~~;

if the first result is a valid address, choosing the first result as the IP address for the first

device, otherwise, subtracting 1 from the IP address of the second device

terminating the virtual circuit to form a second result and choosing the second

result as the IP address for the first device.

10. (Currently Amended) A method as recited in Claim 1, further comprising the step of:
automatically communicating an inventory of all interfaces associated with the first
device to the remote device upon establishing connectivity with the remote
device.
11. (Canceled)
12. (Currently Amended) A computer-readable storage medium ~~carrying~~ storing one or more
sequences of instructions for provisioning a first device operable with internet protocol
(IP) in a virtual circuit network, which instructions, when executed by one or more
processors, cause the one or more processors to carry out the steps of:
the first device requesting a list of identifiers corresponding to virtual circuits from a
configuration interface for the virtual circuit network;
receiving [[a]] the list of identifiers corresponding to virtual circuits from [[a]] the
configuration interface for the virtual circuit network; and
iteratively applying each identifier to individual instances of interface configuration
commands until connectivity with a remote device is established, comprising the
steps of:

requesting, from a second device terminating the virtual circuit corresponding to
an identifier selected from the list, an IP address of the second device;
wherein the second device terminating the virtual circuit is operable to provide
connectivity to the remote device;
~~obtaining an~~ receiving the IP address ~~for a~~ of the second device terminating the
virtual circuit corresponding to ~~[[an]]~~ the identifier selected from the list;
determining an IP address for the first device;
testing the virtual circuit corresponding to the identifier selected from the list for
connectivity with the remote device; and
if the virtual circuit corresponding to the selected identifier provides connectivity
to the remote device, then choosing the virtual circuit corresponding to the
selected identifier for connecting to the remote device, otherwise,
iteratively applying the above steps for a next identifier in the list until the
list is exhausted.

13. (Currently Amended) A computer-readable medium as recited in Claim 12, wherein the virtual circuit network comprises a frame relay network, and wherein the instructions for carrying out the step of receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprise instructions for carrying out the step of:
receiving a Local Management Interface (LMI) message comprising a list of at least one of a plurality of Data Link Connection Identifiers (DLCIs) in the network.
14. (Currently Amended) A computer-readable medium as recited in Claim 12, wherein the virtual circuit network comprises an Asynchronous Transfer Method (ATM) relay network, and wherein the instructions for carrying out the step of receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprise instructions for carrying out the step of:
receiving an Interim Local Management Interface (ILMI) message comprising a list of at least one of a plurality of Virtual Channel Identifiers or Virtual Path Identifiers (VCI/VPI) in the network.

15. (Currently Amended) A computer-readable medium as recited in Claim 12, wherein the instructions for carrying out the step of iteratively applying each identifier to individual instances of interface configuration commands until connectivity with [[a]] the remote device is established further comprise instructions for carrying out the step of:
iteratively incorporating successive virtual circuit identifiers from the list into
dynamically constructed commands to configure an interface to the virtual circuit network and successively applying the commands to the interface.
16. (Currently Amended) A computer-readable medium as recited in Claim 12, wherein the instructions for carrying out the step of testing [[a]] the virtual circuit corresponding to [[an]] the identifier selected from the list for connectivity with [[a]] the remote device further comprise instructions for carrying out the step of:
pinging the remote device, wherein the remote device comprises a configuration server.
17. (Currently Amended) A computer-readable medium as recited in Claim 12, wherein the instructions for carrying out the step of ~~obtaining an~~ requesting the IP address ~~for the of~~ of ~~the second~~ device terminating the virtual circuit ~~corresponding to an identifier selected from the list,~~ comprises instructions for carrying out the steps of:
forming an Inverse Address Resolution Protocol Request (IARP); and
sending the IARP request to [[a]] the second device terminating the virtual circuit; ~~and~~
~~receiving from the device terminating the virtual circuit an IP address.~~
18. (Currently Amended) A computer-readable medium as recited in Claim 12, wherein the instructions for carrying out the step of determining [[an]] the IP address for the first device comprise instructions for carrying out the steps of:
determining a netmask for the first device, wherein the subnet for the first device is
smaller than or equal to a subnet of the second device terminating the virtual circuit corresponding to the selected identifier; and
determining [[an]] the IP address for the first device valid in the subnet of the second device ~~and~~ based upon the IP address of the [[a]] second device terminating the virtual circuit.

19. (Currently Amended) A computer-readable medium as recited in Claim 18, wherein the instructions for carrying out one or more of the steps of determining ~~[[a]]~~ the netmask for the first device and determining ~~[[an]]~~ the IP address for the first device valid in the subnet of the second device ~~and based upon the address of the device terminating the virtual circuit~~, further comprise instructions for carrying out the steps of:
selecting a proposed netmask for a proposed subnet of smallest available size;
testing if ~~[[an]]~~ the IP address ~~for~~ of the second device terminating the virtual circuit ~~corresponding to the selected identifier~~ is valid within the proposed subnet;
if the IP address ~~for~~ of the second device terminating the virtual circuit is valid within the proposed subnet, then performing the following steps:
adding 1 to the IP address of the second device terminating the virtual circuit to form a first result, and testing whether the first result is a valid address;
if the first result is a valid address, choosing the first result as the IP address for the first device, otherwise, subtracting 1 from the IP address of the second device terminating the virtual circuit to form a second result and choosing the second result as the IP address for the first device;
otherwise, increasing the size of the proposed subnet and iteratively performing the above steps beginning with the testing step.
20. (Currently Amended) A computer-readable medium as recited in Claim ~~[[19]]~~ 18, wherein the instructions for carrying out one or more of the steps of determining ~~[[an]]~~ the IP address for the first device valid in the subnet of the second device ~~based upon the address the device terminating the virtual circuit~~ and determining ~~a subnet~~ the netmask for the first device~~[[,]]~~ further comprise instructions for carrying out the steps of:
determining a largest netmask less than or equal to 30 bits (255.255.255.252) such that
 $((ip_address_of_the_device_terminating_VC \& \sim netmask) \neq 0) \&\&$
 $((ip_address_of_the_device_terminating_the\ VC \mid netmask) \neq \sim 0)$ is true;
adding 1 to the IP address of the second device terminating the virtual circuit to form a first result, and testing whether the first result is a valid address;
if the first result is a valid address, choosing the first result as the IP address for the first device, otherwise, subtracting 1 from the IP address of the second device

terminating the virtual circuit to form a second result and choosing the second result is the IP address for the first device.

21. (Currently Amended) A computer-readable medium as recited in Claim 12, further comprising instructions, which, when executed by the one or more processors, cause the one or more processors to carry out the step of:
automatically communicating an inventory of all interfaces associated with the first device to the remote device upon establishing connectivity with the remote device.
22. (Currently Amended) An apparatus for provisioning a first device operable with internet protocol (IP) in a virtual circuit network, comprising:
in the first device, means for requesting a list of identifiers corresponding to virtual circuits from a configuration interface for the virtual circuit network;
means for receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from ~~[[a]]~~ the configuration interface for the virtual circuit network;
means for iteratively applying each identifier to individual instances of interface configuration commands until connectivity with a remote device is established, the means further comprising:
means for requesting, from a second device terminating the virtual circuit corresponding to an identifier selected from the list, an IP address of the second device;
wherein the second device terminating the virtual circuit is operable to provide connectivity to the remote device;
means for ~~obtaining an~~ receiving the IP address ~~for a~~ of the second device terminating the virtual circuit corresponding to ~~[[an]]~~ the identifier selected from the list;
means for determining an IP address for the first device for use with the virtual circuit corresponding to the selected identifier providing connectivity to the remote device;
means for testing ~~[[a]]~~ the virtual circuit corresponding to the identifier selected from the list for connectivity with the remote device.

23. (Currently Amended) An apparatus method as recited in Claim 22, wherein the virtual circuit network comprises a frame relay network, and wherein the means for receiving [[a]] the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprises:
means for receiving a Local Management Interface (LMI) message comprising a list of at least one of a plurality of Data Link Connection Identifiers (DLCIs) in the network.
24. (Currently Amended) An apparatus as recited in Claim 22, wherein the virtual circuit network comprises an Asynchronous Transfer Method (ATM) relay network, and wherein the means for receiving [[a]] the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprises:
means for receiving an Interim Local Management Interface (ILMI) message comprising a list of at least one of a plurality of Virtual Channel Identifiers or Virtual Path Identifiers (VCI/VPI) in the network.
25. (Currently Amended) An apparatus as recited in Claim 22, wherein the means for iteratively applying each identifier to individual instances of interface configuration commands until connectivity with [[a]] the remote device is established further comprises:
means for iteratively incorporating successive virtual circuit identifiers from the list into dynamically constructed commands to configure an interface to the virtual circuit network and successively applying the commands to the interface.
26. (Currently Amended) An apparatus as recited in Claim 22, wherein the means for testing [[a]] the virtual circuit ~~corresponding to an identifier selected from the list for connectivity with a remote device~~ further comprises:
means for pinging the remote device, wherein the remote device comprises a configuration server.

27. (Currently Amended) An apparatus as recited in Claim 22, wherein the means for ~~obtaining an~~ requesting the IP address for ~~the~~ of the second device terminating the virtual circuit ~~corresponding to the selected identifier~~, further comprises:
means for forming an Inverse Address Resolution Protocol Request (IARP); and
means for sending the IARP request to ~~[[a]]~~ the second device terminating the virtual circuit; ~~and~~
~~means for receiving from the device terminating the virtual circuit an IP address.~~
28. (Currently Amended) An apparatus as recited in Claim 22, wherein the means for determining ~~[[an]]~~ the IP address for the first device comprises:
means for determining a netmask for the first device, wherein the subnet for the first device is smaller than or equal to a subnet of the second device terminating the virtual circuit corresponding to the selected identifier; and
means for determining an IP address for the first device valid in the subnet of the second device based upon the IP address of the second device terminating the virtual circuit corresponding to the selected identifier.
29. (Currently Amended) An apparatus as recited in Claim 22, wherein one or more of the means for determining ~~a subnet~~ the netmask for the first device and the means for determining ~~[[an]]~~ the IP address for the first device valid in the subnet of the second device ~~and based upon the address of the device terminating the virtual circuit corresponding to the selected identifier~~, further comprise:
means for selecting a proposed netmask for a proposed subnet of smallest available size;
means for testing if the IP address of the second device terminating the virtual circuit is valid within the proposed subnet;
means for adding 1 to the IP address of the second device terminating the virtual circuit to form a first result, if the IP address of second device terminating the virtual circuit is valid within the proposed subnet, and testing whether the first result is a valid address;
means for choosing the first result as the IP address for the first device if the first result of ~~adding 1 to the IP address of the device terminating the virtual circuit~~ is a valid address, otherwise, subtracting 1 from the IP address of the second device

terminating the virtual circuit to form a second result and choosing the second result as the IP address for the first device; and
means for iteratively invoking the above means beginning with the means for testing.

30. (Currently Amended) An apparatus for provisioning a first device operable with internet protocol (IP) in a virtual circuit network, comprising:
a network interface that is coupled to the virtual circuit network for receiving one or more packet flows via switched virtual circuits therefrom;
a processor;
one or more stored sequences of instructions which, when executed by the processor, cause the processor to carry out the steps of:
the first device requesting a list of identifiers corresponding to virtual circuits from a configuration interface for the virtual circuit network;
receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from ~~[[a]]~~ the configuration interface for the virtual circuit network; and
iteratively applying each identifier to individual instances of interface configuration commands until connectivity with a remote device is established, comprising the steps of:
requesting, from a second device terminating the virtual circuit
corresponding to an identifier selected from the list, an IP address
of the second device;
wherein the second device terminating the virtual circuit is operable to
provide connectivity to the remote device;
~~obtaining an~~ receiving the IP address ~~for a~~ of the second device
terminating the virtual circuit corresponding to ~~[[an]]~~ the identifier selected from the list;
determining an IP address for the first device;
testing the virtual circuit corresponding to the identifier selected from the list for connectivity with the remote device; and
if the virtual circuit corresponding to the selected identifier provides connectivity to the remote device, then choosing the virtual circuit corresponding to the selected identifier for connecting to the

remote device, otherwise, iteratively applying the above steps for a next identifier in the list until the list is exhausted.

31. (Currently Amended) An apparatus as recited in Claim 30, wherein the virtual circuit network comprises a frame relay network, and wherein the instructions for carrying out the step of receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprises instructions for carrying out the step~~[[s]]~~ of:
receiving a Local Management Interface (LMI) message comprising a list of at least one of a plurality of Data Link Connection Identifiers (DLCIs) in the network.
32. (Currently Amended) An apparatus as recited in Claim 30, wherein the virtual circuit network comprises an Asynchronous Transfer Method (ATM) relay network, and wherein the instructions for carrying out the step of receiving ~~[[a]]~~ the list of identifiers corresponding to virtual circuits from the configuration interface for the virtual circuit network further comprises instructions for carrying out the step of:
receiving an Interim Local Management Interface (ILMI) message comprising a list of at least one of a plurality of Virtual Channel Identifiers or Virtual Path Identifiers (VCI/VPI) in the network.
33. (Currently Amended) An apparatus as recited in Claim 30, wherein the instructions for carrying out the step of iteratively applying each identifier to individual instances of interface configuration commands until connectivity with ~~[[a]]~~ the remote device is established further comprises instructions for carrying out the step of:
iteratively incorporating successive virtual circuit identifiers from the list into dynamically constructed commands to configure an interface to the virtual circuit network and successively applying the commands to the interface.
34. (Currently Amended) An apparatus as recited in Claim 30, wherein the instructions for carrying out the step of testing ~~[[a]]~~ the virtual circuit corresponding to ~~[[an]]~~ the

identifier selected from the list for connectivity with [[a]] the remote device further comprises instructions for carrying out the step of:
pinging the remote device, wherein the remote device comprises a configuration server.

35. (Currently Amended) An apparatus as recited in Claim 30, wherein the instructions for carrying out the step of obtaining [[an]] the IP address for the second device terminating the virtual circuit corresponding to the selected identifier, further comprises:
forming an Inverse Address Resolution Protocol Request (IARP); and
sending the IARP request to [[a]] the second device terminating the virtual circuit;~~and receiving from the device terminating the virtual circuit an IP address.~~
36. (Currently Amended) An apparatus as recited in Claim 30, wherein the instructions for carrying out the step of determining [[an]] the IP address for the first device comprises instructions for carrying out the steps of:
determining a netmask for the first device, wherein the subnet for the first device is smaller than or equal to a subnet of the second device terminating the virtual circuit ~~corresponding to the selected identifier~~; and
determining [[an]] the IP address for the first device valid in the subnet of the second device ~~and~~ based upon the IP address of the second device terminating the virtual circuit.
37. (Currently Amended) An apparatus as recited in Claim 36, wherein one or more of the instructions for carrying out the step of determining [[a]] the netmask for the first device and the instructions for carrying out the step of determining [[an]] the IP address for the first device valid in the subnet of the second device ~~and based upon the address of the device terminating the virtual circuit corresponding to the selected identifier~~, further comprise~~[[s]]~~ instructions for carrying out the steps of:
selecting a proposed netmask for a proposed subnet of smallest available size;
testing if [[an]] the IP address for the second device terminating the virtual circuit ~~corresponding to the selected identifier~~ is valid within the proposed subnet;

if the IP address for the second device terminating the virtual circuit is valid within the proposed subnet, then performing the following steps:
adding 1 to the IP address of the second device terminating the virtual circuit to form a first result, and testing whether the first result is a valid address;
if the first result is a valid address, choosing the first result as the IP address for the first device, otherwise, subtracting 1 from the IP address of the second device terminating the virtual circuit to form a second result and choosing the second result as the IP address of the first device,
otherwise, increasing the size of the proposed subnet and iteratively performing the above steps beginning with the testing step.

38. (Currently Amended) An apparatus as recited in Claim 36, wherein one or more of the instructions for carrying out the step of determining ~~[[a]]~~ the netmask for the first device and the instructions for carrying out the step of determining ~~[[an]]~~ the IP address for the first device valid in the subnet of the second device ~~and based upon the address of the device terminating the virtual circuit corresponding to the selected identifier~~, further comprise~~[[s]]~~ instructions for carrying out the steps of:

determining a largest netmask less than or equal to 30 bits (255.255.255.252) such that

$((ip_address_of_the_device_terminating_VC \& \sim netmask) \neq 0) \&\&$

$((ip_address_of_the_device_terminating_the\ VC \mid netmask) \neq \sim 0)$ is true;

adding 1 to the IP address of the second device terminating the virtual circuit to form a first result, and testing whether the first result is a valid address;

if the first result is a valid address, choosing the first result as the IP address for the first device, otherwise, subtracting 1 from the IP address of the second device terminating the virtual circuit to form a second result and choosing the second result as the IP address of the first device.

39. (Currently Amended) An apparatus as recited in Claim 30, further comprising instructions for carrying out the step of:
automatically communicating an inventory of all interfaces associated with the first device to the remote device upon establishing connectivity with the remote device.